25. The maximum size of an IPv4 packet is 65,535. The TCP segment needs to fit inside an IPv4 packet. The IP packet header is 20 bytes and the TCP segment also has a 20 byte packet so subtracting 40 from 65,535 gives 65,495

27.

28. 2^4=32 4\*10ms=40ms

At 40 ms the segment size would be set to 32 KB/s however since the maximum receive size is 24 KB it would automatically be dropped down to 24KB so at 40ms the first full size window will be sent.

31. delay = 10ms x 2=20ms

65,535/20 = 3277 bytes per ms

3277 \* 1000 = 3277000 bytes per second

3277000 \* 8 = 26,216,000 bps

26,216,000 bps/1000000000 = .026 = 2.6% efficiency

32. 1500 byte payload + 20 byte TCP + 20 byte IP + 26 byte Ethernet header = 1566 byte total

Each byte added to the payload requires the sequence number to be incremented by 1 so

The maximum number of payloads that can be sent is 2^32/1500 =2863311.531

((1566 \* 2863311.531 \* 8)/120)/10^6=299 Mbps

33. 2^8\*128 = 32,768 bytes per 30 sec

32,768/30 \* 8 =8738 bps

35. (10^9 / 64) \* 10 \* 4 = 625 MIPS

The system can handle a 1-Gbps line.

36. 2^64 sequence numbers available

75Tbps/8 = 9.375 terabytes per second

(2^64)/(9.375 x 10^12) = 1,967,652 seconds

41. A. 1.5 \* 8 \* 10^6 \* 0.1=1,200,000

B. 10 \* 8 \* 10^6 \* 0.1=8,000,000

C. 45 \* 8 \* 10^6 \* 0.1=4,500,000

D. 155 \* 8 \* 10^6 \* 0.1=124,000,000